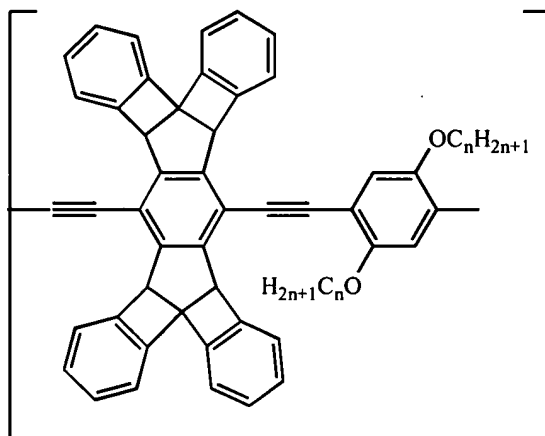


**WHAT IS CLAIMED IS:**

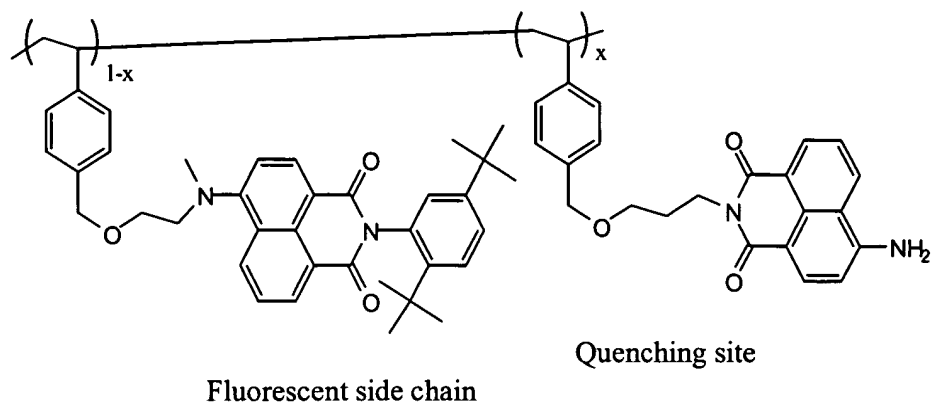
1. A chemical sensor intended for the detection of a type of molecule comprising a fluorescent material capable of forming a charge transfer complex with the type of molecule to be detected and means for  
 5 measuring the variation in fluorescence of said material, characterized in that it additionally comprises a filter comprising a polymer material comprising "molecularly imprinted" cavities, the geometric and chemical configuration of which is defined so as to fix the type of molecule to be detected.

10 2. The sensor as claimed in claim 1, characterized in that the fluorescent material is a polymer comprising a  $\pi$ -conjugated chain of the following type



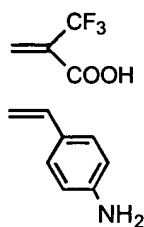
15

3. The sensor as claimed in claim 1, characterized in that the fluorescent material is a polymer comprising side chains of the following type:

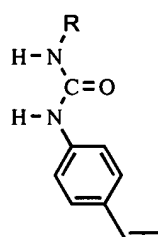


4. The sensor as claimed in one of the preceding claims,  
 5 characterized in that the polymer material comprising "molecularly imprinted"  
 cavities is synthesized from functional monomers which make it possible to  
 generate interactions of hydrogen bond type

Monovalent

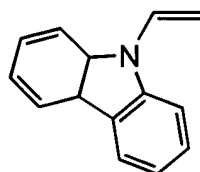
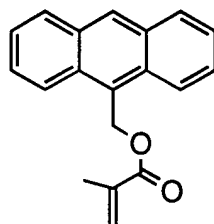


Bivalent

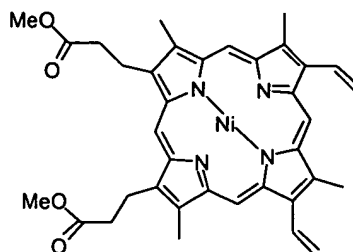


10

or of  $\pi$ - $\pi$  interactions type



or of metal-ligand complexes type



5                    5. The sensor as claimed in one of the preceding claims, characterized in that the fluorescent material is deposited as a thin layer at the surface of at least one first substrate.

10                   6. The sensor as claimed in one of the preceding claims, characterized in that the polymer material comprising "molecularly imprinted" cavities is formed at the surface of a membrane or at the surface of microbeads held in a porous support positioned perpendicular to the charged stream or positioned parallel to the gas stream and arranged in a column of chromatography column type.

15

7. The sensor as claimed in one of the preceding claims, characterized in that it comprises a pump for sucking in an external medium charged with the type of molecule to be detected.

20                   8. The sensor as claimed in the preceding claim, characterized in that it comprises a source of inert gas, which can be nitrogen, positioned downstream of the pump in order to transport the molecules to be detected towards the cavity polymer material.

25                   9. The sensor as claimed in one of the preceding claims, characterized in that it comprises a removable shutter which makes it possible to separate the cavity polymer material from the fluorescent material.

10. The sensor as claimed in one of the preceding claims, characterized in that the means for detecting variation in fluorescence comprise a light source for illuminating the fluorescent material and photodetection means for collecting at least a part of the light emitted by the  
5 complex formed between the fluorescent material and the molecules to be detected or detecting its reduction therein following the formation of the complex.

11. A method for chemical detection of a type of chemical  
10 molecule by a sensor as claimed in one of claims 1 to 10, characterized in that it comprises the following stages:

- the capture of the type of molecules to be detected by the polymer material comprising "molecularly imprinted" cavities,
- the desorption of said molecules by a secondary gas stream  
15 after capture by the polymer material,
- the formation of a complex between the fluorescent material and the molecules to be detected by movement of the gas stream, charged with molecules to be detected, to the fluorescent material,
- 20 - the measurement of variation in fluorescence between the fluorescent material and the complex formed.

12. The method for chemical detection as claimed in claim 11, characterized in that the capture of the type of molecules to be detected is  
25 carried out with a pump, so as to collect a primary stream external to the sensor charged with molecules to be detected.

13. The method for chemical detection as claimed in either of claims 11 and 12, characterized in that it comprises the closing of a shutter  
30 which makes it possible to isolate the polymer material comprising cavities from the fluorescent material during the capturing operation.

14. The method for chemical detection as claimed in claim 13, characterized in that it comprises the opening of the shutter during the

desorption operation, so as to send the secondary stream charged with molecules to be detected in the direction of the fluorescent material.